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Talking Points
California State Board of Food and Agriculture
Meeting on Biofuels
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- The California Energy Commission has a long history of interest in biofuels, dating back to 1978 when we first operated test fleets of vehicles using alcohol/gasoline blends (both ethanol and methanol). The handout I've passed out lists many of the Commission's biofuels-related projects. It also cites various publications related to these activities, with links to the Commission's website.

- In the last 28 years, much has changed about how we view the opportunities and challenges for biofuels as sources of transportation energy for California. Biofuels will have an important and expanded potential role in our motor fuel supply. However, we also face a more difficult set of obstacles than we first thought. I'd like to briefly summarize our current perspective on the opportunities and challenges for biofuels, highlighting some that we see as most relevant to the joint interests of the energy and agricultural communities.

- From an energy standpoint, biofuels, such as ethanol and biodiesel -- as well as other bioenergy applications for electric power generation -- are valuable contributors to California's energy supply. They are important both in terms of diversity and security, and as potential new sources of in-state energy supplies. Energy derived from biomass also appears to be one of the most promising options for reducing greenhouse gas emissions . Advanced technologies, such as those being developed for conversion of cellulosic wastes and residues to ethanol, appear especially promising for their greenhouse gas reduction potential, and for a wide range of other energy, environmental, and waste disposal benefits.

- The energy supply potential of biofuels continues to be a subject of analysis and debate, with wide-ranging answers remaining to the question of "How much of our fuel supply can biofuels contribute?" The Energy Commission's 1999 study of Biomass-to-Ethanol

Potential in California (cited in the handout) estimated the physical resource potential of biomass wastes and residues in the state at 51 million bone-dry tons annually. This is enough for about 3.5 billion gallons of ethanol production, roughly 20% of our current highway motor fuel consumption.

A 2005 assessment by the California Biomass Collaborative places the gross biomass waste and residue resource potential at 86 million BDT annually. However, it estimates the "technical potential" for utilization of these resources at a lower 34 million BDT. Much higher estimates of potential energy supply from biofuels are possible when considering biomass waste and residue utilization and expanded energy crop cultivation. An example is the recent (December 2004) Natural Resources Defense Council study entitled *Growing Energy: How Biofuels Can Help End America's Oil Dependence*. This study finds that aggressive domestic development of biofuels, coupled with advances in vehicle efficiency, could ultimately free the U.S. from dependence on foreign oil imports.

- Efforts to better quantify and characterize the bioenergy supply potential, both for production of biofuels and for power generation, are important and will undoubtedly continue. However, development of bioenergy opportunities offers significant and much-needed energy supply benefits that clearly warrant continued and expanded pursuit by state and federal energy agencies. At the same time, we see that other equally compelling benefits of biofuels, as well as many of the issues facing biofuels development, fall within the purview of agricultural, forestry, environmental and waste management interests and the respective government agencies responsible for these areas.

  The resolution of challenges within these other realms are prerequisites for the confident pursuit of the potential energy contributions and particularly necessary for the significant public and private investments required to capture these opportunities, as noted earlier by Winston Hickox.

- Other speakers have already, or I expect will, touch on some of these non-energy issues affecting biofuels development. For example, Dean Simeroth of the California Air Resources Board will follow up on air quality issues. On July 8, the Energy Commission, in collaboration with the Air Resources Board, held a workshop on Air Quality and Opportunities to Expand Use of Alternative Transportation Fuels. This was part of the Commission's 2005 Integrated Energy Policy Report.

- Besides air quality issues, the pursuit of various biomass-energy opportunities often encounters challenges that fall within the realms of waste management and forest management. For example, there has been a lot of interest lately in a rulemaking by the Integrated Waste Management Board that has major implications for potential projects that would use portions of the municipal waste stream to produce ethanol or other forms of bioenergy. The sometimes controversial subject of forest thinning treatment for fire protection also continues to affect the potential for utilization of forest materials for energy production.

- We have also encountered a number of biofuel development issues that might be resolved most effectively by the agricultural community. Some of these issues involve expanding California's uses of agricultural wastes, residues and by-products. Others involve the larger overall picture of the potential contribution of energy crops to our energy supply. The long-standing "food versus fuel" controversy; involving the pros and cons of using land, water and other natural resources to produce energy crops; continues to surface in various forms. We believe the agricultural community, not the energy community, is best-suited to take the lead in resolving these types of issues.

- For our part, the energy side also has its share of issues and challenges to confront in determining the role of biofuels in the state's future energy picture. For example, how much and which types of biomass feedstocks are best suited for biofuels production, versus other energy applications such as biopower generation, remains an important question. And the development and commercialization of technologies that can effectively and economically convert various forms of biomass to ethanol and other biofuels remains an elusive goal.

- To better address these types of multilateral issues, the Energy Commission is taking the lead in organizing a new Interagency Bioenergy Working Group consisting of seven state agencies with interests in bioenergy development. In addition to the Energy Commission; the Department of Food and Agriculture, and the Air Resources Board, the Department of Forestry and Fire Protection, the Public Utilities Commission, the Water Resources Control Board, and the Integrated Waste Management Board are also participants. The first two meetings of this Working Group held over the last two months appear to be a promising start to overcoming the challenges to expanded development of biofuels in California and establishing more consistent state policies and state agency activities toward realizing the state's bioenergy opportunities.

- The Energy Commission also intends to increase its focus on biofuels and other forms of bioenergy as part of our regular Integrated Energy Policy Report process. Our 2005 Report will incorporate the initial results of the Interagency Working Group's efforts and findings of relevant public workshops, such as the one mentioned earlier, on air quality issues. Then, our 2006 Report update will focus in more detail on bioenergy as a featured subject.

- One ongoing Energy Commission activity involves pursuing a petroleum displacement goal as directed by AB 2076 of 2000. We are continuing to evaluate potential strategies for achieving 20% use of non-petroleum on-road transportation fuels by 2020, and 30% by 2030. These are goals recommended by the Energy Commission and the Air Resources Board in the August 2003 joint agency report "Reducing California's Petroleum Dependence." Working groups of stakeholders representing all major alternative fuels, including ethanol and biodiesel, have been formed to help pursue the potential of these fuels for petroleum displacement.

- The Energy Commission is also the primary sponsor of the California Biomass Collaborative at the University of California Davis, with a mission to "enhance the

sustainable management and development of biomass in California." The Collaborative, led by Dr. Bryan Jenkins, has already produced some valuable products (such as the biomass resource assessment referred to earlier), and promises to be a major contributor to the advancement of California's bioenergy opportunities.

Energy Commission Biofuels-Related Program Activities
1978 - 2005

Ethanol/Gasoline Blend Vehicle Fleet Demonstration (1978)

- First documented experience w/ ethanol fuel in California (10% ethanol w/gasoline)
- Testing with unmodified 1978 Honda CVCCs
- Collaboration with Santa Clara University
- Report: Methanol/Ethanol Gasoline Blend Fuels Demonstration with Stratified Charge Engine Vehicles, March 1980

SB 620 (Mills, 1979) Ethanol Production Feasibility Studies and Ethanol Vehicle Demonstrations (1980–1983)

- 7 potential ethanol production projects examined from 1980-1983
- One 8 million gal/yr project (Raven Distillery) funded; operated for 18 months
- Testing of 1980 Ford Pintos and 1981 Volkswagen Rabbits -- dedicated ethanol vehicles using 95-98% ethanol
- Two ethanol fueling facilities installed (Sacramento & Vallejo)
- Reports: SB 620 Ethanol Production Demonstration Program, Staff Report, Dec. 1981
  California's Ethanol Production Demonstration Program, 1982 report for SB 620, Dec. 1982
- Paper: MacDonald, T., California's Twenty Years of Alcohol-Fueled Vehicle Demonstrations Reviewed, Thirteenth International Symposium on Alcohol Fuels Stockholm Sweden, 2000

Sustainable Technology Energy Partnership (STEP) Project (1997)

- Collaboration w/ U.S. DOE/NREL, U.C. Davis & Waste Energy Integrated Systems
- Provided preliminary conceptual design for a biomass-to-ethanol demonstration plant
- Feedstocks evaluated included mixed waste paper, yard waste, agricultural residues, waste wood and food processing waste
- Report: Feasibility Study of Ethanol Production from Biomass Residues in San Joaquin County, California, Dec. 1997

Gridley and Collins Pine Biomass-to-Ethanol R&D Projects (1996-99)

- Joint-funded projects with U.S. DOE
- Dilute acid hydrolysis process evaluation
- Rice straw and wood waste feedstock evaluations
- Environmental site evaluations

http://www.energy.ca.gov/pier/renewable/biomass/ethanol/index.html

MTBE Alternatives Study (1999)
http://www.energy.ca.gov/mtbe/index.html

- Examined the potential for a California phaseout of MTBE
- Reviewed candidate replacement oxygenates, including ethanol
- Looked at near-term ethanol supply potential from out-of-state and in-state sources
- Report: Supply and Cost of Alternatives to MTBE in Gasoline, March 1999
  http://www.energy.ca.gov/mtbe/documents/index.html

Biomass-to-Ethanol Study (1999)

- Directed by Governor's Executive Order D-5-99 (March 1999)
- Prepared by CEC staff assisted by Arcadis Geraghty & Miller, SAIC, ProForma Systems, Inc., Energy Security Analysis
- Estimated in-state potential for ethanol production from biomass wastes and residues
- Analyzed various biomass-to-ethanol production facility configurations employing different types of feedstocks
- Provided options and recommendations for state government actions to foster a biomass-to-ethanol industry
- Report: Evaluation of Biomass-to-Ethanol Fuel Potential in California, Dec. 1999
  http://www.energy.ca.gov/mtbe/ethanol/index.html

Ethanol Production Technology Evaluations (1999-2005)

- Follow up to 1999 Biomass-to-Ethanol Study
- Staff has interviewed all known N. American ethanol production process technology developers
- Regular status monitoring of active biomass-to-ethanol process developers; internal list of "Active Biomass-to-Ethanol Process Technology Developers" (updated Feb. 2005)
- Active facilitation/participation in forums for exchange of R&D information and progress updates – e.g., Biomass Conference of the Americas (1999); DOE California Ethanol Workshop (April 2003); Biofuels Workshop and Trade Show, Western & Pacific Region (Oct. 2004); National Ethanol Conference (Feb. 2005)

Evaluation of Options for Advancing Biofuels Production and Application (1999-2005)

- Follow up to 1999 Biomass-to-Ethanol Study
- Regularly monitor and report on federal and other state regulatory and incentive programs – e.g., issue paper "Implications of Proposed Federal Energy Legislation for Ethanol/Gasoline Blending In California", July 2003)
- Analytical support for California legislative proposals, e.g. SB 1728 (Costa) – Ethanol Production Incentive (2002)
- Report: Ethanol Fuel Incentives Applied in the U.S., Reviewed from California's Perspective, Jan. 2004)
  http://www.energy.ca.gov/reports/2004-02-03_600-04-001.PDF

- Presentations: McCormack, M., The Outlook for Ethanol Use in California Transportation Fuels – Policy Drivers, Challenges and Opportunities, World AG Expo, Tulare CA, February 2005
  http://www.energy.ca.gov/papers/2005-02-08_MCCORMACK.PDF
  Perez, P., Policy Drivers and Challenges for Ethanol Use in Transportation, and Production in California, Rice Straw Products Expo, Sacramento, August 2004
  http://www.energy.ca.gov/ethanol/documents/2004-08-09_PEREZ_ETHANOL.PDF

Biomass-to-Ethanol Cost/Benefit Study (2001)

- Follow up to 1999 Biomass-to-Ethanol Study
- Based on analyses by Arthur D. Little and Jack Faucett Associates
- Found positive cost/benefit for potential state investments in a biomass-to-ethanol industry
- Report: Costs and Benefits of a Biomass-to-Ethanol Production Industry in California, March 2001
  http://www.energy.ca.gov/reports/2001-04-03_500-01-002+002A.PDF

Ethanol Supply Studies (2001-2005)

- Continually examine ethanol supply potential to meet California's oxygenate requirements from out-of-state sources
- Detailed surveys conducted of U.S. ethanol supply industry
- Established adequacy of ethanol supply to fulfill CA's MTBE phaseout requirements
- Specific focus on in-state ethanol production projects; regular monitoring of CA project development, interviews with project proponents, and site visits; internal list of "Potential California Ethanol Projects Under Discussion", circulated to interested state agencies (July 2001)
- Reports: U.S. Ethanol Industry Production Capacity Outlook, Aug. 2001; 2002 Update of U.S. Ethanol Industry Production Capacity Report, July 2002; Ethanol Supply Outlook for California, Oct. 2003
  http://www.energy.ca.gov/reports/2003-10-21_600-03-017F.PDF
- Paper: MacDonald, T., California's Progress Toward an Ethanol Fuel Industry, Fourteenth International Symposium on Alcohol Fuels, Phuket, Thailand November 12-15, 2002

Ethanol Cost/Price Assessment (2003-2005)

- Evaluate and report on implications of replacement of MTBE with ethanol in California's gasoline supply
- Included in report to Governor: Causes of Gasoline and Diesel Price Increases in California, March 2003 and subsequent updates
  http://www.energy.ca.gov/2003_price_spikes/index.html
- Ethanol price trend charts regularly updated on Commission's website
  http://www.energy.ca.gov/gasoline/graphs/ethanol_10-year.html

International Biofuels Assessment and Collaboration (2002-2005)

- Track foreign biofuels development programs and progress – ethanol in Brazil, Caribbean countries, Thailand, Sweden, etc.; biodiesel in Europe

- Host foreign delegations on biofuels-related topics – e.g. Brazilian ethanol industry and government representatives
- Participate in international biofuels forums – e.g., International Symposia on Alcohol Fuels (2000, 2002, 2005), Thailand Ethanol Workshop (2000), International Fuel Ethanol Workshop and Trade Show (2002), Power Crops for the Americas Conference (2003)

2005 Integrated Energy Policy Report (IEPR) Alternative Fuel Working Groups for Ethanol and Biodiesel (2004-2005)

- Stakeholder working groups to advise Commission staff on strategies to achieve Energy Commission recommended 2020 and 2030 alternative fuel use goals
- Major objectives - Identify barriers to increased use of ethanol and biodiesel in California, necessary actions to overcome barriers, business-as-usual and aggressive fuel use goals for 2020, strategies to achieve aggressive goals, and appropriate roles for government and industry
- By invitation participation by a cross-section of industry stakeholders and state agencies including major oil companies, fuel blenders and distributors automakers, environmental groups, fuels technology companies, vehicle /fuel user coalitions, renewable fuel interests, regulatory entities, trade organizations, and investment/bank community interest, and fuel producers
- State agency participation - Energy Commission, California Department of Food and Agriculture, California Air Resources Board

  http://www.energy.ca.gov/fuels/petroleum_dependence/index.html
  http://www.energy.ca.gov/energypolicy/index.html

Interagency Biomass Working Group (2005)

- Energy Commission is organizing at the request of the Governor's Office
- State agency participants: Energy Commission, Air Resources Board, Cal EPA, Integrated Waste Management Board, Department of Food and Agriculture, Public Utilities Commission, Department of Forestry and Fire Protection, Water Resources Control Board
- To address interagency issues associated with utilization of biomass resources
- Presentation: Keese, W., Expanding Opportunities for Biofuels, keynote address at Biofuels Workshop and Trade Show, Western and Pacific Region, Sacramento, October 2004 http://www.energy.ca.gov/papers/2004-10-26_KEESE_BIOFUELS.PDF